

The Use of White Rice Bran as a Substitute for Wheat Flour in the Manufacture of Various Indonesian Foods and Beverages

E. R. Umami Kalsum¹, Djauhar Arifin² and Kuswardhani³

¹ Hospitality Lecturer, Bandung Institute of Tourism, Deputy Director for Student Affairs and Alumnae, Bandung Institute of Tourism, Bandung Indonesia

² Patisserie Management Lecturer, Bandung Institute of Tourism, Bandung, Indonesia

³ English Hospitality Lecturer, Bandung Institute of Tourism, Bandung Indonesia

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Abstract: Currently, most Indonesian people like eating wheat noodles after China. Actually, there are so many other types wheat that can grow well in Indonesia and can be an alternative towards food security, which is called rice bran. Rice bran is the outermost layer of rice that is released during the process of grinding rice or by – products of rice milling that consists of layers of “aleurone”, “endosperm” or rice grains and rice husk skin. The potential of rice bran a nutritious food has been widely studied, however, its use and development as a decent and easy food has not been done much. The staple food for community should ideally be sourced from local raw materials that have been neglected so far or have not been utilized maximumly. Moreover, rice bran itself is a food ingredient that a fiber content of 12% higher than the graots and bran. As stated by Ardiansyah (2004) that bran has nutritional content, such as fiber, vitamin B complex, protein, thiamine, and niacin are more abundant in bran. Therefore, it is worth consuming for human (Nursalim and Zalni, 2005). Bran is really appropriate with agro-climate in most parts of Indonesia. While bran does not only have high benefits that contains nutrients could have positive effects on health, but also has quite extensive used and suitable for food diversification. Considering the development of food especially in Bakery and Pastry products as well as the nutritional content contained white rice bran, the researchers use rice bran to substitute wheat flour in making kinds of foods and beverages, such as sponge cake bran, cookies rice bran, wedang rice bran, rice bran papaya juice and rice bran bit Juice. All products have sweet taste and have stink flavor, however to minimize the stink flavor the products could be mixed with chocolate, cheese, palm sugar or pineapple. As bran is one of the main ingredients in producing those products that can be consumed by all Indonesian society with reasonable price and easy to get it

1 INTRODUCTION

Many people describe rice bran as a waste with a rancid, musty, and sour odor. In fact, rice bran has a special taste that is soft and rather sweet. An unpleasant odor will appear as rice bran is damaging. However, rice bran itself has several advantages such as to prevent colon cancer, coronary heart disease, obesity, diabetes, digestive problems, and minimize cholesterol levels. In addition, Indonesia as a tropical country has numerous diversity of commodities especially when it comes to rice commodity. Therefore, the diversity of rice types can be utilized in making rice bran in various types of food and drinks. Although it is very abundant in our country and the benefits contained in rice bran are good enough, however the use of

rice bran has not been maximized. Most people use rice bran only as animal feed. This can be a chance to develop rice bran as alternative potential product that can be replaced a wheat flour in the manufacture of traditional Indonesian food and drinks

2 BACKGROUND

2.1 Research Background

Many people describe rice bran as a waste with a rancid, musty, and sour odor. That unpleasant odor only appear if the rice bran is damaged. In fact, rice bran has a special taste that is soft and rather sweet. To illustrate the exact understanding, rice bran is the outermost layer of rice that is released during the

process of grinding rice (rice) or by-products of rice milling which consists of layers of aleuron, endosperm, and germ. Rice bran itself contains a high fiber content (20-27%), hence rice bran has its own advantages to prevent colon cancer, coronary heart disease, obesity, diabetes and digestive problems. In addition, rice bran contains a fairly high carbohydrate (51-55 g / 100 g) and very good protein (11-13 g / 100 g). Another prominent nutrient in rice bran is fat, the levels reach 10-20 g / 100 g. Moreover, rice bran is also rich in vitamin B complex and vitamin E. In addition, rice bran is an excellent source of minerals, every 100 grams contains calcium 500 -700 mg, magnesium 600-700 mg, and phosphorus 1,000-2.200 mg. According to Ardiansyah (2004) the nutritional value of rice bran is very good, rich in B vitamins, vitamin E, essential fatty acids, food fibers (dietary fibers), protein, oryzanol, ferulic acid, thiamine, niacin. Rice bran also contains carbohydrates, minerals, and rice bran oil which can reduce cholesterol levels. One hundred grams of rice bran contains 2.49%, 8.77% protein, 1.09% fat, 1.60% ash, 1.69% fiber, 84.30% carbohydrates, 382.32 cal. calories, and very fit for human consumption (Nursalim and Zalni, 2005). Furthermore, Nutritious Food Products The Agency for Agricultural Research and Development (Balitbangtan) through the Center for Agricultural Postharvest Research and Development, recently years has produced various technologies to increase the use of rice bran as a food product. The stabilization process to extend the shelf life of bran and prevent rancidity, which has been an obstacle in its utilization has been overcome.

The development of the culinary world in Indonesia is highly influenced by many aspects, one of them is the diversity of commodities available in this country. Existing aspects do not only come from staples, Indonesia's tropical climate greatly influences the diversity of rice types that can be utilized in making rice bran in various types of food and drinks. Although it is very abundant in our country and the benefits contained in rice bran are good enough, however the use of rice bran has not been maximized. Most people use rice bran only as animal feed. By considering the development of food in the world of patisseries as well as the nutritional content contained in white rice bran, the authors will make white rice bran as the material of this research. The Researcher is interested in pouring into this community service program with the theme: *"Alternative Use of White Rice bran to replace part of wheat flour in the manufacture of traditional Indonesian food and beverages"*. Therefore a

study of white rice bran conducted to replace a portion of wheat flour in the manufacture of traditional Indonesian foods and drinks.

2.2 Question Arise

Based on the background stated above, Some questions are identified as follows:

- a. What are the results of the consumer's assessment of the taste, price of food and beverages made from bran?
- b. What is the nutritional content of food and drinks made from rice bran?

2.3 Research Objectives

The purpose of this research is to fulfill several purposes, namely:

- a. Formal Purpose: The purpose of this writing as one of the requirements in the Tri Dharma of Higher Education is to conduct research as a Lecturer.
- b. Operational Objectives: To find out public opinion about the taste of food and drinks made from rice bran, To find out the nutritional content in food and drink made from rice bran, To take advantage of rice bran which has only been considered as waste.

3 METHODS

The method used in this study was qualitative. As for the requirements of collecting data, there are several steps that researchers used as their way to collect data. Here are several steps that have been used by researchers.

3.1 Theoretical Approach

Theoretical approach is a step for finding theory related to definition of rice bran, rice bran nutritional content, and the benefits provided by rice bran based on the daily consumption.

3.2 Setting Goals

The main focus of this step is to find several ways in order to make rice bran as a substitute product of wheat flour so that it can be used as the opportunity in increasing income for cake processing practitioners in areas that have a lot of rice bran products.

3.3 Pre-Field Activities

Pre-field activities are carried out to find places where there are a lot of rice mills and rice bran, could be taken and tested into food and drinks processing with several recipes compared and taken the best products.

3.4 Implementation of Research

This step concerned in determination of where does this research would take place. Afterward, researchers will do their research in the place that have been determined.



Figure 1: Rice Bran Sponge

3.5 Post Research Activities

This phase generates a final report start from the beginning of the activity up to the summary file of the recipes (gathered with pictures of the products made). By the end, the report will be socialized to the public so that it can be used for related community to produce the rice bran product independently.

4 RESULTS

This research is conducted at the researchers' place using main ingredients that researchers get from rice mills that are around Bandung and West Java. Previous researchers had conducted a research using rice bran for other products and the results obtained were good however it was still rather difficult to be applied in the area with the conditions of human resources had not yet been supplied, so for this study the researchers have tried to make the products which are easier and can be done by beginners and housewives who are expected later to be able to increase their economy and income.

Then, researchers found that Rice Bran can be proceed as several types of food and drink products such as Rice Bran Sponge, Rice Bran Cookies, Rice Bran drink (*wedang bekatul*)¹, Rice Bran Bit Juice. Here are the nutritional content of each food and drink products.

Table 1: Nutritional Content of Rice Bran Sponge

Quantity	Ingredients	Energy	Fat	Carbohydrates	Protein
		(cal)	(g)	(g)	(g)
4 pcs	egg	352.8	23.86	1.85	3.19
200 gr	granulated sugar	774	0	199.96	0
1 tsp	emulsifier		0	0	0
150 gr	Rice bran	412.5	22.2	81.9	18.9
50 gr	wheat flour	182.5	0.65	38.65	4.45
1 tbsp	baking powder	10.6	0	0	0
100 ml	coconut milk	230	23.84	5.54	2.29
100 ml	frying oil	450	50	0	0
2 tbsp	cocoa powder	2.28	0.14	0.58	0.2
1 sachet	white coffee	110	3	15	1
		2524.68	123.69	343.48	30.03
			1113.21	1373.92	120.12
Total Calories					607.25

Source: The Researchers Product,2019



Figure 2: Rixe Bran Cookies

Table 2: Nutritional Content of Rice Bran Cookies

Quantity	Ingredients	Energy	Fat	Carbohydrates	Protein
		(cal)	(g)	(g)	(g)
100 gr	margarine	526	59.17	0	0.6
75 gr	butter	537.75	60.83	0.05	0.64
25 gr	room butter	170.25	20.27	0.01	0.21
40 gr	milk powder	20	0.8	1.88	1.32
360 gr	soft wheat flour	1314	4.68	277.2	32.04
40 gr	rice bran	110	5.92	21.8	5.04
75 gr	palm sugar	282.75	0	72.99	0
80 gr	white chocolate	431.27	25.67	47.39	4.69
30 gr	cocoa powder	3.42	0.21	0.87	0.3
3 tablespoons	chocolate paste	29.33	1.19	3.64	1.11
3 tablespoons	chocolate color	0	0	0	0
1 teaspoon	baking powder	3.53	0	0	0
approximately C	hoco chip	0	0	0	0
Approximately	nuts for decoration	0	0	0	0
.		3428.23	178.74	425.83	45.95
			1608.66	1703.32	183.8
Total Calories					3495.78

Source : The Researchers Product,2019



Figure 3: Rice Bran Drink (Wedang Bekatul)

Table 3: Nutritional Content of Wedang Rice Bran

Quantity	Ingredients	Energy	Fat	Carbohydrates	Protein
		(cal)	(g)	(g)	(g)
2 tablespoons	rice bran	55	2.96	10.92	2.52
150 ml	water	0	0	0	0
50 gr	Brown sugar needed	188.5	0	48.66	0
		243.5	2.96	59.58	2.52
			26.64	238.32	10.08
Total Calories					275.04

Source : The Researchers Product,2019



Figure 4: Rice Bran Bit Juice

Table 4: Nutritional Content of Rice Bran Papaya Juice

Quantity	Ingredients	Energy	Fat	Carbohydrates	Protein
		(cal)	(g)	(g)	(g)
150 gr	papaya	39	0.14	981	0.61
150 gr	pineapple	72	0.18	18.95	0.81
150 cc	water	0	0	0	0
15 grams	rice bran	55	2.96	10.92	0.256
1 tablespoon	honey (optional)	64	0	17.3	0.06
		230	3.28	1028.17	1.736
			29.52	4112.68	6.944
Total Calories					4149.144

Source: The Researchers Product, 2019

5 DISCUSSION

Rice bran is the outermost part of rice which still has a lot of nutritional content as much as wheat has. Therefore, rice bran could be used to improve local society's nutrition. In fact, certain supermarkets already sells the rice bran in an attractive packages. However, as the price and the buyer is relatively low, therefore, the products can't be found yet.

In the process of research, researchers found that Bandung District can be used as a potential area which are related certainly to rice paddy production and have a rice mill, so that the ingredients needed can be found easily. Furthermore, the rice bran doesn't lose its nutritional content even though they undergo process and change in the form of food and drinks products.

6 CONCLUSION

Finally, we can conclude that rice bran could be used as a substitute for wheat flour in the manufacture of several food and beverage products. Rice bran itself can be used as an alternative energy source while it is produced in the form of food and beverage products. Based on the research, all the product result by recipe from researcher doesn't lose its nutritional content for example Rice Bran Sponge with 2.607 calories, Rice Bran Cookies with 3495.78 calories, Wedang Rice Bran with 275.04 calories, and Rice Bran Papaya Juice with 4149.144 calories.

All products price are reasonable and could be mixed with some other ingredients to avoid having stink flavour of rice bran and the taste of the products are acceptable by public. Above all, those products can be produced on a household scale.

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